DOCUMENT RESUME

ED 198 116 SP 017 481

AUTHOR Mahlios, Marc C.
TITLE Field-Dependence Theory: Perspectives on Learning, Teaching, and the Preparation of Teachers.
PUB DATE Feb 80
NOTE 32p.: Paper presented at the Annual Meeting of the Association of Teacher Educators (60th, Washington, DC, February 16-20, 1980).

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Academic Achievement: Behavior Patterns: *Cognitive Style: Feedback: Individual Differences: *Interaction Process Analysis: *Student Behavior: *Student Teacher Relationship: *Teacher Behavior: Teacher Characteristics: *Verbal Communication

ABSTRACT

This study was concerned with investigating patterns of verbal interaction of teachers and students who were matched and mismatched in field dependent and field independent cognitive styles. The first objective was to answer the general research question: Is there a difference in the patterns of dyadic classroom interaction when the teacher and the student are similar and dissimilar in cognitive style? Teacher-student similarity in cognitive style was examined in relation to: frequency and initiation of dyadic classroom contact: quality of interaction: dyadic classroom activity: conceptual level of questions: praise and criticism of behavior: quality of feedback: and sustaining the interaction. The second objective was to search for possible interactions between the cognitive styles of teachers and students and the context of the interaction, i.e. public or private. (Author/JD)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED198116

Field-Dependence Theory: Perspectives on Learning, Teaching, and the Preparation of Teachers

Dr. Marc C. Mahlios
Fort Hays State University
Hays, Kansas

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Marc C. Mahlios

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Presented at the 60th Annual Meeting of the
Association of Teacher Educators
Washington, D.C.
February 16-20, 1980

SP 017481

Field-Dependence Theory: Perspectives on Learning,
Teaching, and the Preparation of Teachers

Much has been published and discussed about the role of students' cognitive styles in their learning behavior and of teachers' cognitive styles in their teaching behaviors (8, 9, 11, 21, 25, 26, 27, 29, 30). However, surprisingly little research has been conducted to document the interactive effects of teachers' and students' cognitive styles within the classroom. The research that does exist has tended to examine the interactive effects of teacher-student cognitive styles on rather broad, summary categories of behavior, such as interpersonal attraction. To date initial research in the area has focused primarily on neurological and perceptual characteristics of pupils that affect their acquisition and retention of knowledge and skills, secondarily on the extent to which instructional styles of teachers compliment student learning needs and processes and only incidentally on the combinatory effect of the two. It has been argued elsewhere (23) that only through intensive investigations of the interactive effects of the major personological variables (of which cognitive style is one) will we learn to design instruction which maximizes each students' success in the learning effort. The present study is such an investigation.

Consideration of individual differences in both teachers and students raises the possibility of optimal matching. For example, Cronbach (4), Hunt (18), Lesser (22), Thelen (31) and Yamamoto (37) have reported studies of various matching models in education which have gone beyond traditional concepts of grouping pupils for instruction on the basis of ability of aptitude. A large number of studies comparing authoritarian-democratic leadership styles, convergent-divergent thinking styles, warmth and enthusiasm,

introversion-extroversion, belief systems and numerous other variables have generally found mixed results in student process and product outcomes. Brophy and Good (3) reviewed a large number of studies involving teacher-student matching models and concluded that the most promising strategy for optimal matching was to be found in the area of conceptual level, or cognitive style.

DeStefano (6) found that teachers and students in regular classroom situations viewed one another more positively when matched to each other in cognitive style, than when mismatched. Morevoer, the positive and negative evaluations included not only personal but cognitive characteristics as well. James (19) in a study similar to DiStefano's found significantly greater interpersonal attraction in matched than in mismatched teacher-student dyads.

Similar match-mismatch effects of cognitive style have been observed in other social-interaction contexts, e.g., the patient-therapist interactions (13, 17); peer interaction, and client-counselor interaction (5, 29). Collectively these studies suggest that cognitive style match-mismatch effects on interpersonal attraction are usually measureable in social interactions where individuals are working toward the solution of a common objective. The literature reflects three possible sources for mutual attraction (persons matched in cognitive style to like each other better) and facilitation (greater progress in achieving the goal of the interaction, whether the goal is better learning by students, or improved emotional states in patients). These sources are (a) shared interests, (b) shared personality characteristics (34, 35) and (c) similarity in modes of communication (7, 14, 20, 24, 29). It is plausible that interaction between teachers and students should proceed more smoothly, and mutual

feelings between them should be more positive, when as functions of similarity in cognitive style, they share similar interests, have common personality attributes, and use similar communication modes.

Thus, there appears to be indirect, yet supportive, evidence that teachers and students who share similar cognitive styles and ways of viewing their surround may enhance not only their interpersonal attraction but more importantly facilitation of the core of the teaching-learning process. If one assumes that individual teachers and students bring to the classroom their own particular, stylized ways of thinking and viewing themselves and their social context, it follows that these varying cognitive styles would be manifested in the primary medium of the teaching-learning process, namely in the verbal communication between teachers and students. A particular pair of teacher and student contrasting greatly in their cognitive style may be unable to establish sufficient communication within the question-answer-feedback process, whereas similarity in this respect may facilitate the interaction. Thus the rationale for the present study can be reduced to a basic interaction hypothesis that teacher-student similarity in cognitive style increases interaction by facilitating communication and interpersonal attraction within the teaching-learning dyad.

RESEARCH OBJECTIVE

The present study was concerned with investigating patterns of verbal interaction of teachers and students who were matched and mismatched according to cognitive style. The purposes of the investigation were two-fold. The first objective was to answer the general research question: Is there a difference in the patterns of dyadic classroom interaction when the teacher and student are similar and dissimilar in cognitive style? A set of subquestions followed from this: Is teacher-student similarity in

cognitive style related to: Frequency of dyadic contact; initiation of dyadic contact; quality of interaction; dyadic classroom activity; conceptual level of questions; praise and criticism of student academic performance; praise and criticism of behavior; quality of feedback; and sustaining the interaction.

The second objective of the investigation was to search for possible interactions between the cognitive styles of teachers and students, their sexes and the context of the interaction, i.e., public or private.

METHOD

Subjects

The sample consisted of 48 dyads, including 12 elementary school teachers (6 men and 6 women) and 48 of their students (4 per classroom; 2 boys and 2 girls). Subjects were selected on the basis of their scores on the Group Embedded Figures Test (GEFT). The six highest and six lowest scoring teachers (6 male and 6 female) were selected. Similary, the 2 highest and 2 lowest scoring students in each of the selected teacher's classroom were included. The final sample consisted of 48 teacher-student dyads; 24 similar in cognitive style and 24 dissimilar in cognitive style.

Instruments

Brophy and Good (2) developed a system, Teacher-Child Dyadic Interaction (TCDI), for coding dyadic classroom interaction. Emphasis is on dyadic interaction since the coding system applies only to those classroom interactions in which the teacher is dealing with a single child. There are two major differences between the present TCDI system and other systems in common use: (a) It does not attempt to code all classroom behavior. Expository lecturing and other situations in which the teacher

is addressing the entire class as a group are omitted entirely, (b) the teacher's interactions in the class are recorded and analyzed separately for each individual student, so that the student rather than the class is treated as the unit of analysis.

The TCDI system does not involve coding everything that goes on in the classroom. However, every interaction between the teacher and an individual child is coded. In addition, several aspects of the system involve preservation of the sequential nature of teacher-child interaction, so that cycles of initiation and reaction are maintained in the coding process. This feature allows separation of effects due primarily to the teacher from effects due primarily to the child.

Nine different types of dyadic interaction situations were coded in the present study:

1. Frequency of dyadic contacts - in which the child publicly attempts to answer a question posed by the teacher; teacher-child interaction concerning seat work, homework and procedural matters; plus teacher evaluation of student behavior.
2. Initiation of dyadic interactions - in which the child seeks out the teacher for help in resolving academic or procedural matters; or situations in which the teacher seeks out a pupil for evaluation of an academic or procedural task.
3. Quality of dyadic interaction - in which the teacher evaluates, positively or negatively, teacher-student interchange in public and private, academic and procedural matters.
4. Dyadic classroom activity - the total number of dyadic interchanges within the classroom.

5. Conceptual level of questions - cognitive level of question posed by the teacher in the classroom.
6. Praise and criticism of student academic performance - teacher assessment of student academic performance.
7. Praise and criticism of behavior - in which the teacher disciplines the child or makes individual comments on his classroom behavior.
8. Quality of feedback - in which the nature of teacher's feedback reaction to the child's answer is noted.
9. Sustaining the interaction - in which the teacher attempts to maintain and further the dyadic interchange.

The Group Embedded Figures Test (GEFT) is a perceptual test that measures the cognitive style dimension known as field-dependence-independence. The GEFT (36) has been modeled on the individually administered Embedded Figures Test (EFT) (36) with respect to mode of presentation and format. The GEFT contains 18 complex figures, 17 of which were taken from the EFT.

The score is the total number of simple forms correctly traced in the second and third sections combined. The items in the first section were not included in the total score but used as a means of confirming that the subject had understood the test directions.

The GEFT's were all scored by an independent rater. The independent GEFT rater withheld the scores of the participants from the observers in order to insure objectivity and avoid possible contamination of the data. Only after the total 96 hours of classroom observation was completed were the actual scores of the subjects (teachers and students) made known to the author. The split-half reliability for the GEFT was reported by the publishers to be .82.

Procedures

The study took place during the 1977-78 academic year. A total of eight hours of observation, over three to four days, was made in each of the twelve classrooms observed. Each teacher-student dyad was observed for twenty-four five minute units randomly distributed throughout the eight hour observation period. The teachers were not told which four students were being observed in the classrooms and thus were, presumably unaware of the significance of their interactions with these specific students. Recording was conducted only during lessons in which regular academic activities occurred.

In the present investigation the only materials used were those needed to record student and teacher responses to the GEFT. No extraneous instructional materials were used, and no instructional interventions were attempted on the part of the investigator. No apparent disruption of the natural teaching-learning process in the classrooms took place.

Analysis of the Data

Two types of measures were derived from the TCDI coding categories: quantitative and qualitative. Quantitative measures are frequency scores drawn from the coding instrument that are used to compare teachers or students on how often various codable events occur. The second type of measures are proportions derived from the coding categories to get qualitative scores. The basic logic involved in the second type of measure is to identify sets of coding categories that apply in given situations, such as teacher feedback responses following correct answers or teacher behavior during afforded work contacts. There are several codes for teacher behavior in these instances. Teacher-child interaction patterns involving different

children will differ from one another in two ways. The first is quantitative: a given child will have more correct answers in the same observation time than another child. The second difference is qualitative: regardless of the differences in the number of right answers, there may also be differences in the percentage of teacher reactions of different types when the child has given the right answer. Differences in the latter types of patterns can be measured by using ratio scores which express the teacher's frequency of giving a particular response to a right answer as a percentage of the teacher's total responses to right answers.

Data recorded using the TCDI resulted in 65 dependent measures for each of the 48 dyads in the 2x2x2x2 factorial design. Data were analyzed using a multivariate analysis of variance technique (10) and examined the main effects of student sex, student cognitive style, teacher sex, teacher cognitive style, as well as the first, second and third-order interactions.

Results

The positive findings are presented in nine sections, one for each of research subquestions.

Frequency of Dyadic Contact

Female teachers asked significantly more ($F(1,32) = 6.50$, $p \ll .01$) direct questions than male teachers; field-independent teachers asked significantly more ($F(1,32) = 5.58$, $p < .05$) direct questions than field dependent teachers; and teachers who were female and field-independent provided significantly more ($F(1,32) = 5.14$, $p < .05$) direct student response opportunities than did other teachers. The recipient of open question response opportunities was more often ($F(1,32) = 4.23$, $p < .05$) a male child in public dyadic interaction with a field-dependent female teacher.

On measures related to private, teacher-afforded contacts male teachers provided significantly more ($F(1,32) = 4.66$, $p < .05$) work-related contacts than female teachers regardless of cognitive style. Teachers did not differ significantly in the number of procedural contacts they afforded students. Examination of private dyadic behavioral contacts revealed that male students received a greater total number of behavioral contacts from their teachers, and also a significantly greater number ($F(1,32) = 7.36$, $p < .01$) of behavioral warnings than did female students. In addition, field-dependent students regardless of their sex were much more likely ($F(1,32) = 5.22$, $p < .05$) to receive behavioral warnings from a male teacher than a female teacher.

The data showed a different pattern when the private dyadic contact was child created. In this setting children created a greater number ($F(1,32) = 5.14$, $p < .05$) of work-related contacts with field-dependent teachers and also with male teachers who were field-independent.

Overall the summary measures for this category show that field-dependent teachers were more likely to afford a greater number ($F(1,32) = 5.42$, $p < .05$) of work-related contacts than field-independent teachers, and that these field-dependent teachers were more often ($F(1,32) = 10.92$, $p < .005$) female.

Initiation of Dyadic Interaction

Female teachers initiated significantly more ($F(1,32) = 9.00$, $p < .01$) public contacts with students than male teachers. This occurred in two ways. First, female teachers asked more ($F(1,32) = 5.20$, $p < .05$) direct questions of their students in proportion to the total direct plus open questions asked. Secondly, female teachers asked a significantly greater

number ($F(1,32) = 4.96$, $p < .05$) of direct questions of students in proportion to the total set of public response opportunities measured (discipline, direct, open and call-out).

In contrast, teacher initiated dyadic contacts in private work-related interactions were more often ($F(1,32) = 6.04$, $p < .01$) afforded by male teachers.

Examination of the significant four-way interaction (see Figure 1) revealed that field-independent male teachers afforded a greater number ($F(1,32) = 5.91$, $p < .05$) of private work-related contacts to female students than did field-dependent male teachers. This was true regardless of the cognitive style of the female students. In contrast, male students received a greater number of teacher afforded private work-related contacts from their male teachers when male teachers and student shared similar cognitive styles.

Female teachers present a different pattern in this setting. In general, female teachers afforded a greater number of work-related contacts to field-independent students than field-dependent ones. Unlike male teachers, females afforded more work-related contacts to children who were dissimilar to themselves in cognitive style. In sum, field-independent male students received more work contacts from field-dependent female teachers, while field-independent female students received a greater number of the same contacts from teachers similar to themselves in both cognitive style and sex.

The primary means by which students initiate contacts with their teachers were through child created work contacts. There was no significant difference in the manner in which children initiate public contacts with teachers, i.e., call-out versus direct response. Finally, students initiated significantly

more ($F(1,32) = 5.62$, $p < .05$) private work contacts with field-dependent teachers than field-independent teachers.

Quality of Dyadic Contact

Field-independent teachers tended to praise the behaviors of their students much more ($F(1,32) = 7.08$, $p < .01$) than field-dependent teachers. This pattern holds for public as well as private dyadic contacts. Field-dependent students, of both sexes, were the major recipients ($F(1,32) = 4.56$, $p < .05$) of criticism from male, field-independent teachers.

Dyadic Classroom Activity

There were no significant differences between the sex and cognitive style factors of teachers and students, or any interactions of these factors, that affected the amount of dyadic classroom activity.

Conceptual Level of Questions

Field dependent teachers were found to use a significantly greater proportion ($F(1,32) = 4.96$, $p < .05$) of multiple-choice questions to the total set of questioning levels measured. Male field-dependent teachers were much more likely ($F(1,32) = 4.96$, $p < .05$) to use self-reference questions as a major part of their questioning style than female teachers or teachers of either sex who were field-independent.

Most teacher questions were product (factual) in nature. Field-independent teachers asked a greater proportion ($F(1,32) = 4.24$, $p < .05$) of product level questions and tended to direct them more frequently to field- dependent students. Finally, field-independent, male teachers asked a greater proportion ($F(1,32) = 5.02$, $p < .05$) of product level questions than field-independent female teachers or field-dependent teachers of either sex.

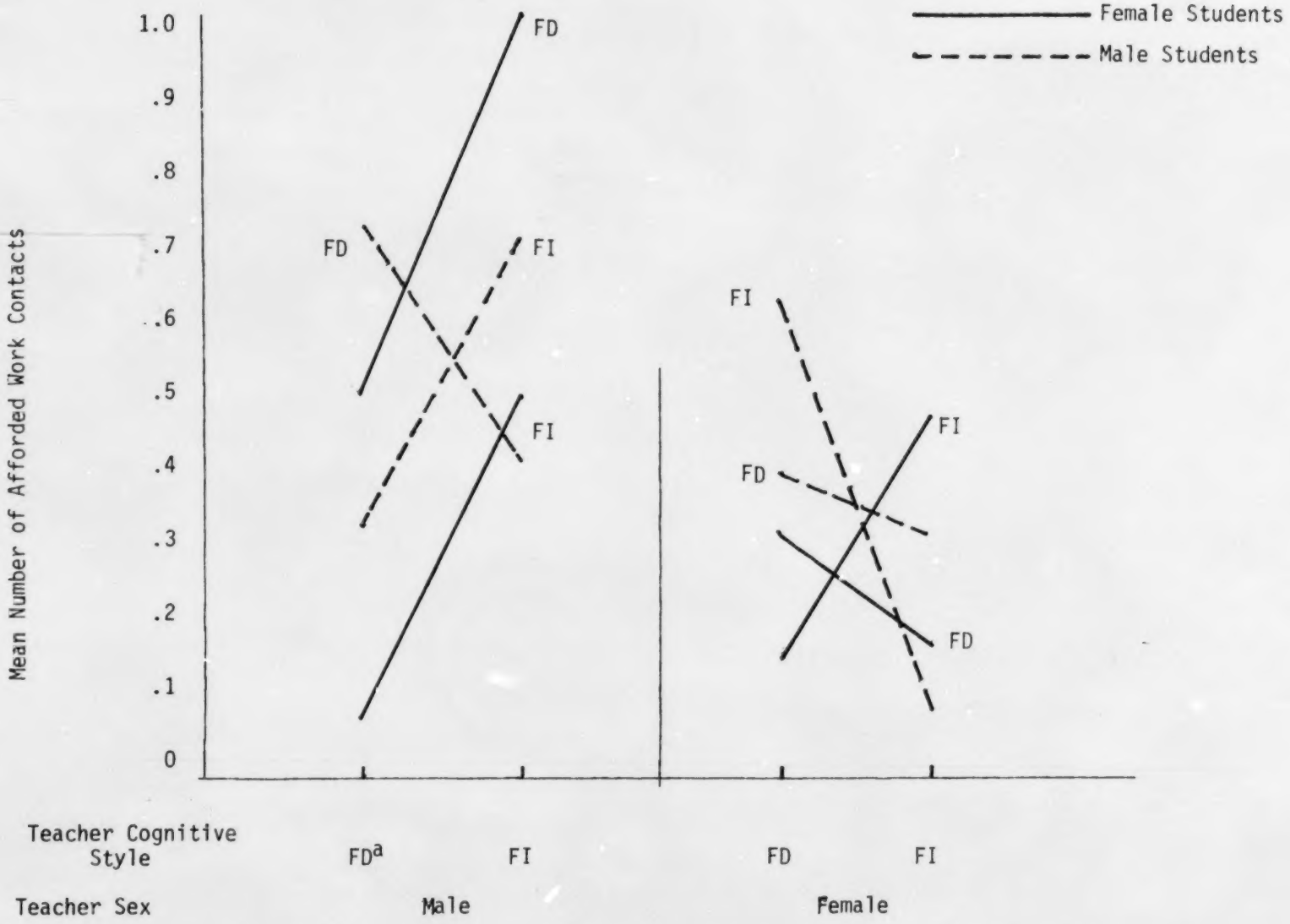

Figure 1-Mean number of teacher afforded private work related dyadic contacts ([a]FD=field-depentent, FI= field-independent)

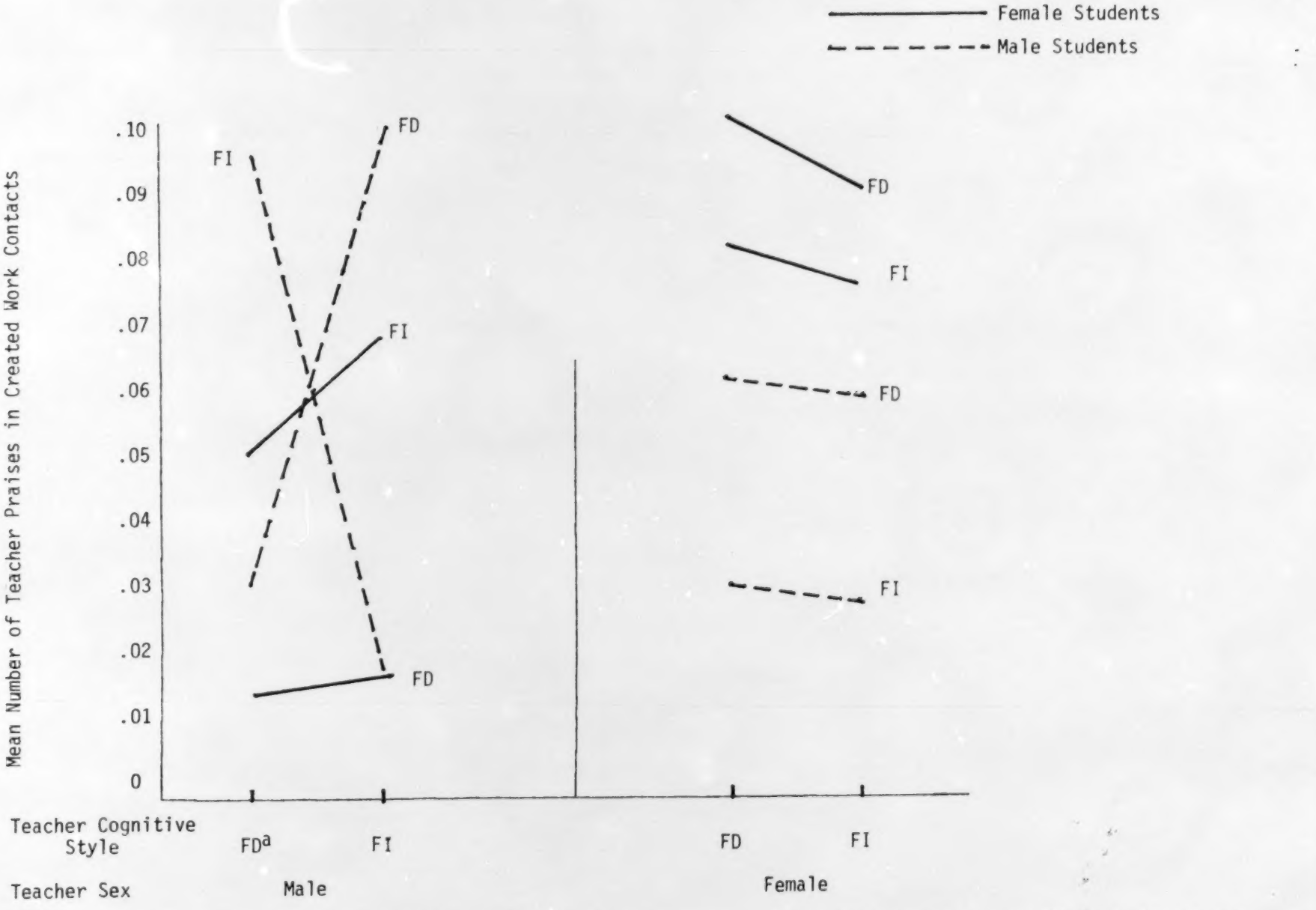

Figure 2: Mean Number of Teacher Praises in Created Work Contacts ([a]FD=field-dependent, FI-Field-independent)

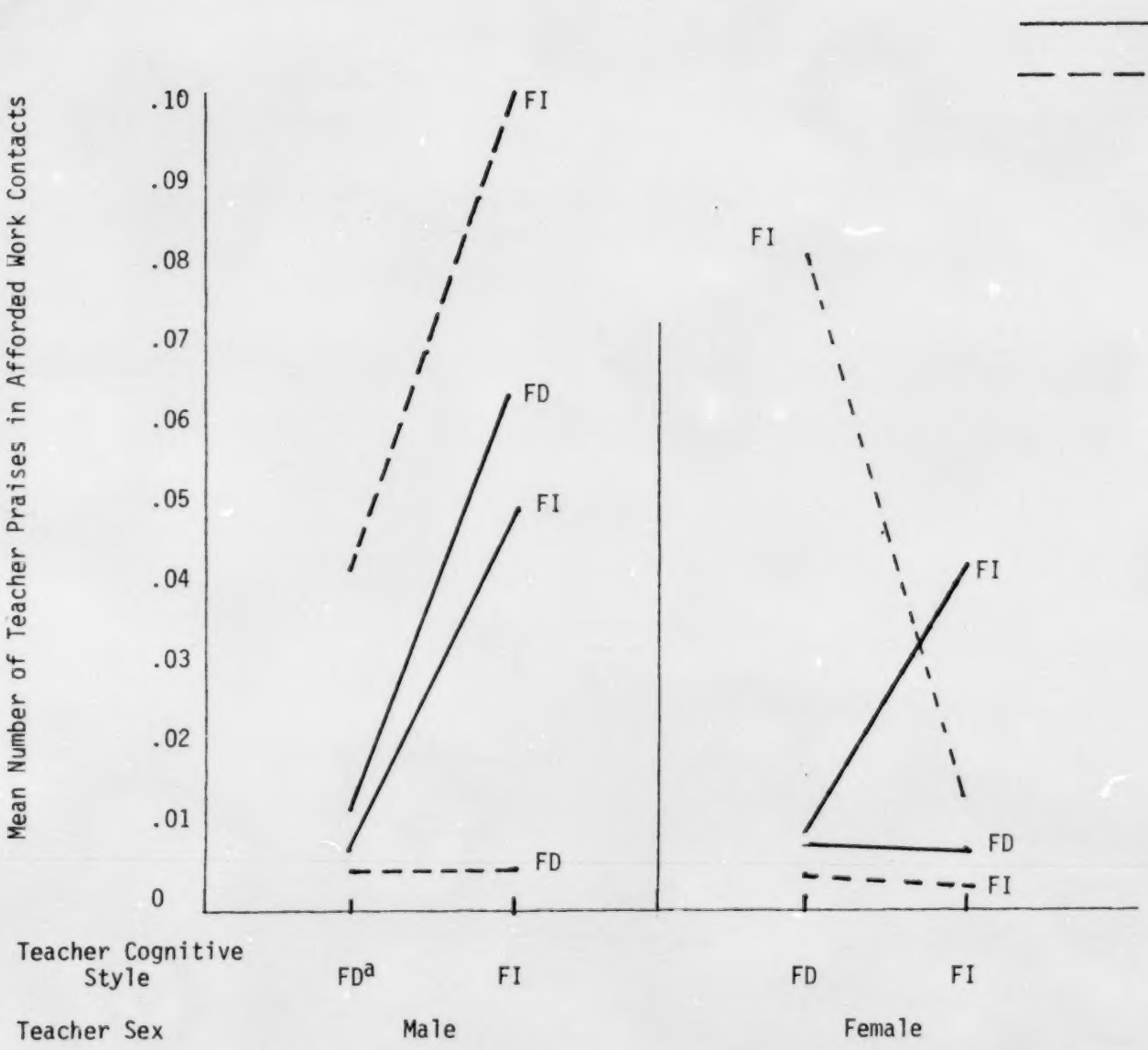

Figure 3: Mean Number of teacher praises in afforded work contacts ([a]FD=field-dependent, FI=field-independent)

Praise and Criticism of Student Academic Performance

Field-dependent teachers of both sexes viewed the answers of their male students as correct significantly more often ($F(1,32) = 4.67$, $p < .05$) than those of female students.

Field-independent male teachers viewed student answers as partially correct significantly more often ($F(1,32) = 10.25$, $p < .005$) than the rest. In addition, male teachers, of both cognitive styles, tended to evaluate their students' answers as partially correct significantly more often ($F(1,32) = 4.17$, $p < .05$) when interacting with students who were male and field-dependent. Female teachers were more apt ($F(1,32) = 5.74$, $p < .05$) to evaluate student academic work as incorrect than their male counterparts. No discernible, consistent pattern was evident with respect to the effect of either teacher or student sex or cognitive style factors on the number of teacher perceived errors students made during reading sessions or in instances in which students did not respond to a teacher's question.

Praise of academic work in general did not differ significantly in the amount given between teachers' however, there was a significant difference ($F(1,32) = 7.58$, $p < .01$) in the amount of praise male teachers gave to field-independent students in private work-related dyadic contacts.

Field-independent male teachers more often ($F(1,32) = 4.15$, $p \leq .05$) praised the academic work of their male students who were field-dependent, and female students who were field-independent (See Figure 2). Field-independent male students were more likely to receive praise in created work contacts from field-dependent male teachers.

Teachers praised more when the contact between teacher and child was teacher afforded (See Figure 3). Field-independent male teachers gave

significantly more ($F(1,32) = 4.17$, $p < .05$) praise to male students who were field-independent.

Field-independent female teachers gave a greater amount of praise to female children who were also field-independent. Field-dependent female teachers gave more praise, in afforded work contacts, to field-independent male students.

Male field-independent teachers tended to be more ($F(1,32) = 5.64$, $p < .05$) critical of field-independent students' academic work in private teacher afforded work-related contacts. Overall male field-independent teachers were more ($F(1,32) = 5.64$, $p < .05$) critical of field-dependent student's academic work.

Praise and Criticism of Behavior

Male students received a significantly greater ($F(1,32) = 12.86$, $p < .005$) number of behavioral warnings and criticisms than did female students. This was true regardless of student cognitive style.

In addition, male students tended to receive a significantly greater number ($F(1,32) = 7.00$ $p < .01$) of behavioral praises when interacting with female field-dependent teachers.

Quality of Teacher Feedback

Female teachers who were field-dependent gave process feedback to field-dependent students significantly more often ($F(1,32) = 5.82$, $p < .05$) than field-independent students.

When teachers and students were engaged in private child created dyadic work contacts male field-independent teachers gave considerably more ($F(1,32) = 5.89$, $p < .05$) process feedback to field-independent students. In the context of teacher afforded work contacts male field-independent

teachers provided more ($F(1,32) = 4.36$, $p < .05$) process feedback than field-dependent teachers. Teachers gave significantly more ($F(1,32) = 5.82$, $p < .05$) process feedback to field-dependent children. However, in private dyadic work interactions male teachers, who were field-independent, gave more ($F(1,32) = 5.46$, $p < .05$) process feedback, especially to field-independent students. There were no significant differences between any of the groups with respect to the kind of feedback teachers provided students following their answers to academic questions, regardless of their accuracy, with one exception; field-dependent female teachers were more likely to affirm student answers that were perceived correct than other teachers ($F(1,32) = 5.28$, $p < .05$).

Sustaining Interaction

There were no significant differences between any groups with regard to their willingness to sustain dyadic interaction. Even though teachers and students differ on sex and cognitive style factors which affect their initial contacts, these same factors did not appear to encourage or discourage sustained interaction.

Discussion

Teachers' Teaching Behavior

Studies of teaching preferences and teacher behavior in simulated teaching situations provide evidence of consistent behavioral differences between field-dependent and field-independent teachers. This evidence indicates, first of all, that while relatively field-dependent teachers favor teaching situations that allow greater direct interaction with students, field-independent teachers prefer teaching situations that are more impersonal in nature and oriented toward the more cognitive aspects of teaching (35). Findings of the present study generally support these findings. Field-independent teachers

(particularly females) tended to use lecture and discovery techniques, while field-dependent teachers (particularly male) evidenced in their teaching behavior and self-report that class discussion accomplished in private dyadic interactions represented better teaching and learning. It is important to note that such a discussion approach not only emphasizes social interaction but also gives the student more of a role in structuring the classroom situations; it is not surprising then that students seek out field-dependent teachers more often than field-independent teachers for private dyadic discussions.

Field-independent teachers tend to use questions more frequently in introducing topics and following student answers. The focused questioning approach used by more field-independent teachers may be seen as the main avenue for these teachers to attempt translation of a discovery approach within the context of classroom interaction. Thus, both lecture and discovery approaches reserve to the field-independent teacher much of the organization of the learning situation, either through facilitating and guiding student learning or through providing information. Therefore, the teacher and his or her classroom behavior vary in a fairly consistent manner depending on the cognitive style of the teacher.

Also in agreement with the findings above on teacher-directiveness were the findings concerning initiation of contacts. The results of the present study suggested that field-independent teachers used direct questioning techniques with students more frequently than field-dependent teachers. In addition, field-independent teachers have been found to be less accepting and indeed more critical of student answers than field-dependent teachers. These findings are also consistent with the evidence of a study (1) that field-dependent persons are less likely to express hostility

toward others than field-independent people. This difference may be interpreted in terms of a greater sense of separate identity of field-independent people. The field-dependent person's greater reliance on others for self-definition makes it difficult for him or her to criticize and thus antagonize others.

In conclusion, it may be stated that the role of the teacher and the behavioral specifics that issue from it are related to the cognitive orientation of the teacher. Thus, to a certain extent, teacher behavior in selected contexts can be predicted in a fairly reliable manner from knowledge of their cognitive style.

Student Learning Behavior

Field-independent persons tend to learn more than field-dependent persons under conditions of intrinsic motivation (1). Findings of the present study suggests that when allowed field-independent students tended to work independently in quiet study periods and were much less likely than their field-dependent peers to seek out the teacher for academic help. Field-independent teachers in particular, and teachers in this study in general, viewed this type of student behavior as a highly desirable learning behavior. While it is not known what student growth results from these distinctive learning styles, one implication is that field-dependent students receive more individual teacher instructional time.

There is increasing evidence that differences in students' cognitive styles may strongly influence their learning depending on the kind of reinforcements applied by the teacher. In the present study, field-independent teachers tended to be the most critical of student academic performance. This was reflected in the extent to which these teachers

viewed the answers of their students as only partially-correct. It was found that the answers offered by field-dependent students in public dyadic interactions were viewed as partially correct significantly more often than the answers of field-independent children. However, in private dyadic interactions field-dependent children's answers were more likely to receive teacher praise. It may be that teachers perceive public interactions with field-dependent students as an opportunity to make an impact on their learning and behavior, by openly challenging their answers and thus creating a need to either support or adopt a new position, while using private interactions as a setting in which to provide support and security for these learners. The question remains, however, what effect (positive, negative or mixed) does negative feedback have on the learning outcomes of field-dependent students.

In the cognitive realm persons with an articulated (i.e., field-independent) cognitive style are likely to analyze a field when the field is organized, and to impose structure on a field when the field lacks organization of its own (12). Persons with a global field-dependent cognitive style are more likely to go along with the field as it is, without using such mediational processes as analyzing and structuring. Frequently in learning, the materials to be learned lacks clear structure to create the requirement that the learner provide organization as an aid to learning. Field-dependent persons have been found to have greater difficulty in learning such material compared to field-independent people. General support for these findings are found in the present study. Teachers offered significantly more process feedback to field-independent students. This form of feedback may be characterized as more complex, ambiguous, and less structured than the product (factual) feedback more often afforded field-dependent children.

It seems probable that teacher understanding of the learning style differences of field-dependent and field-independent children affected their choice of feedback techniques. Only in private interactions did field-dependent children receive more process feedback than field-independent children. This was in many instances due to a lack of understanding on the part of the field-dependent student, in which case the feedback often took the form of re-explanation or simple paraphrasing of the concept and not that of additional conceptual extension or abstraction.

In summary, there appears to be distinct differences in the learning behavior of students who possess differential cognitive styles. What these differences mean in terms of learning outcome is again not clear.

Implications

Students play a vital role in controlling the frequency and type of teacher-student interaction. The present study does not permit any firm conclusions regarding the effects of these interactions on student learning or on the development of the students' social skills. It nevertheless, seems reasonable to assume that, given what is known about differences in how students of a particular cognitive style learn, some students are receiving instruction more appropriate to their learning needs than others. While field-independent teachers show some awareness of the learning preferences of field-dependent children, these teachers structure their classes in terms of a lecture format more often than group discussions or private dyadic discussions. On the other hand, field-dependent teachers make greater use of discussion techniques and thus limit more abstract inquiry methods that appear to promote greater growth in field-independent students.

In each instance a sizeable group of children receive far fewer opportunities than optimal for using the teacher as an appropriate resource for improving either academic or interpersonal skills.

The findings of the present study suggest ways to make the educational experience more effective and relevant to students. One possibility would be to examine the effects of placing students in classrooms according to their cognitive style. It appears likely that in a classroom balanced between field-dependent and field-independent students, in which appropriate instructional techniques were selectively applied, desired learning outcomes could be achieved with much greater economy. Critical here, however, would be teacher awareness of their preferred instructional style and teaching behaviors, plus specific knowledge of the learning preferences of their students, so that more refined and appropriate instruction may be supplied to each child.

A second way in which the present findings may be used to improve teaching is by providing feedback to teachers regarding their pattern of interacting with specific students. This information could prove valuable in helping teachers discover whether they were in fact relating to students in the way they thought they were. In addition, with the specific knowledge of learning and behavior differences associated with different cognitive styles, teachers could be more prescriptive in instructing students and also in helping them develop greater diversity in learning styles and in adjusting to different teaching styles and behaviors. Equally important, however, such data could prove to be an important tool for a school psychologist or instructional design specialist to the classroom. The usefulness of detailed verbal feedback to teachers has been supported in a number of studies (15, 16, 32, 33).

Teacher Type

While the primary interest of this study was focused on the influence of teacher-student cognitive similarity on dyadic interactions, several interesting findings were noted in relation to teacher type.

Review of literature concerning the effects of cognitive similarity on the dyadic interactions of the helping agent (counselor, therapist, etc.) and client suggested that similarity would enhance the relationship and contribute to more desirable outcome. In general, the results of the present study were not consistent with these findings. It would appear that the complexities of the role of teacher in the classroom attenuate, substantially, the potential for positive attraction and teaching outcomes between cognitively similar teachers and students. In other words, the kinds of interactions observed between cognitively similar individuals in other dyadic settings (for example, psychotherapy) are largely unaffected by the unique combination of factors that characterize a complex classroom in which the teacher interacts with many personalities within relatively short periods of time, across many curriculum areas. Nonetheless, the findings, based on the data of this study, suggests that teacher cognitive types do interact differentially with students who also vary in cognitive style. Thus the need to understand more fully the implications of cognitive style on teacher behavior is recognized.

Teacher-Student Similarity

The most suprixing findings of this study were those concerning the influence of teacher-student cognitive similarity on dyadic interactions in the classroom. It was anticipated that teachers would initiate significantly more positive contacts with students similar to themselves, and that students

would do likewise. However, little actual support was found for such a relationship. It is obvious that what was taking place was a complex interplay of student type and sex, teacher type and sex, and the situation in which the interaction was occurring (i.e., the general class discussion versus the private dyadic interactions).

REFERENCES

1. Bogo, J., Winget, W. M., & Gleser, M.D. Ego defenses and perceptual styles. Perceptual and Motor Skills, 1970, 30, 599-605.

2. Brophy, J. E., & Good, T. L. Teacher-child dyadic interaction: A manual for coding classroom behavior. (Report Series No. 27). Austin, Texas: The Research and Development Center for Teacher Education, The University of Texas, 1969.

3. Brophy, J. E., & Good, T. L. Teacher student relationships: Causes and consequences. New York: Holt, Rinehart & Winston, 1974.

4. Cronbach, L. J. The two disciplines of scientific psychology. American Psychologist, 1957, 12, 671-684.

5. Dingman, R. L. A study of cognitive style differences as a factor of communications in school counseling (Doctoral dissertation, Wayne State University, 1971). Dissertation Abstracts International, 1972, 32, 6756A. (University Microfilms No. 72-14, 544)

6. DiStefano, J. J. Interpersonal perceptions of field independent and field dependent teachers and students (Doctoral dissertation, Cornell University, 1969). Dissertation Abstracts International, 1970, 31, 463A-464A. (University Microfilms No. 70-11, 225)

7. Doob, L. W. Behavior and grammatical style. Journal of Abnormal and Social Psychology, 1958, 56, 398-400.

8. Engelhardt, J. M. The relationship between a deminsion of cognitive style and the teaching behavior of prospective elementary teachers of mathematics. (Doctoral Dissertation, University of Texas at Austin, 1972). Dissertation Abstracts International, 1973, 33, 4934A. (University Microfilms No. 73-7548)

9. Ferrell, J. G. The differential performance of lower class, preschool, Negro children as a function of the sex of E, sex of S, reinforcement condition, and the level of field dependence (Doctoral dissertation, University of Southern Mississippi, 1971). Dissertation Abstracts International, 1971, 32, 3028B-3029B. (University Microfilms No. 71-28, 831)

10. Finn, J. D. A general model of multivaraite analyses.(Version V, Release 3). New York: Holt, 1976.

11. Fitz, R. J. The differential effects of praise and censure on serial learning as dependent on locus of control and field dependency (Doctoral dissertation, Catholic University of America, 1970). Dissertation Abstracts International, 1971, 31, 4310B. (University Microfilms No. 71-1457)

12. Fleming, M. L., Knowlton, J. Q., Blain, B. B., Levie, W. H., & Elerian, A. Message design: The temporal dimension of message structure. Final Report. Bloomington, Ind.: Indiana University, 1968. (ERIC Document Reproduction Service No. ED 023 294)

13. Folman, R. Z. Therapist-patient perceptual style, interpersonal attraction, initial interview behavior, and premature termination (Doctoral dissertation, Boston University, 1973). Dissertation Abstracts International, 1973, 34, 1746B. (University Microfilms No. 73-23, 482)

14. Freedman, N., O'Hanlon, J., Oltman, P., & Witkin, H. The imprint of psychological differentiation on kinetic behavior in varying communicative contexts. Journal of Abnormal Psychology, 1972, 79, 239-258.

15. Fuller, F. F., Peck, R. F., Bown, O. H., Menaker, S. L., White, M. M., & Veldman, D. J. Effects of personalized feedback during teacher preparation on teacher personality and teacher behavior. Austin, Texas: Report Series No. 4, The Research and Development Center for Teacher Education, University of Texas. United States Office of Education Grant No. OE3-10-032, 1969.

16. Gage, N. L., Funkel, P. J., & Chatterjee, B. B. Equilibrium theory and behavior change: An experiment in feedback from pupils to teachers. Report No. 6 in Studies in the generality and behavioral correlates of social perception. Urbana: Bureau of Educational Research, College of Education, University of Illinois, 1960.

17. Greene, M. A. Client perception of the relationship as a function of worker-client cognitive styles (Doctoral dissertation, Columbia University, 1972). Dissertation Abstracts International, 1972, 33, 3030A-3031A. (University Microfilms No. 72-31, 213)

18. Hunt, D. E. Matching Models in Education: The Coordination of Teaching Methods with Student Characteristics (Canada: Ontario Institute for Studies in Education, 1971).

19. James, C. D. R. A cognitive style approach to teacher-pupil interaction and the academic performance of black children. Unpublished master's thesis, Rutgers University, 1973.

20. Jennings, B. S. Some cognitive control variables and psycholinguistic dimensions (Doctoral dissertation, University of Florida, 1967). Ann Arbor, Mich.: University Microfilms, 1968, No. 68-13, 011.

21. Koran, M. L., Snow, R. E. and McDonald, F. J. Teacher aptitude and observational learning of a teaching skill. Journal of Educational Psychology, 1971, 62, 219-228.

22. Lesser, W. M. The relationship between counseling progress and empathic understanding. Journal of Counseling Psychology, 1961, 8, 330-336.

23. Mahlios, Marc C. and Ralston, Mack A. Implications of Cognitive Style for Teachers and Learners. Arizona State University (Paper presented at 58th Annual Meeting of Association of Teacher Educators, Las Vegas, Nevada, January 31-February 3, 1978).

24. Marcus, E. S. The relationship of psychological differentiation to the congruence of temporal patterns of speech. Unpublished doctoral dissertation, New York University, 1970.

25. Moore, C. A. Styles of teacher behavior under simulated teaching conditions (Doctoral Dissertation, Stanford University, 1973). Dissertation Abstracts International, 1973, 34, 3149A-3150A. (University Microfilms No. 73-30, 449)

26. Ohnmacht, F. W. Relationships among field independence, dogmatism, teacher characteristics and teaching behavior of preservice teachers. Paper presented at the meeting of the American Educational Research Association, New York, February 1967. (ERIC Document Reproduction Service No. ED 011 525)

27. Paclisanu, M. I. Interacting effects of field-dependence, stimulus deprivation and two types of reinforcement upon problem-solving in elementary school children (Doctoral Dissertation, Temple University, 1970). Dissertation Abstracts International, 1970, 31, 2290B-2291B. (University Microfilms, No. 70-11, 763)

28. Shapson, S. M. Hypothesis testing and cognitive style in children. Unpublished doctoral dissertation, New York University, 1973.

29. Shows, W. D. Psychological differentiation and the A-B dimension: A dyadic interaction hypothesis (Doctoral dissertation, Duke University, 1967). Dissertation Abstracts, 1968, 28, 3885B. (University Microfilms No. 68-2744)

30. Steinfeld, S. L. Level of differentiation and age as predictors of reinforcer effectiveness (Doctoral dissertation, Hofstra University, 1973). Dissertation Abstracts International, 1973, 34, 2912B-2913B. (University Microfilms No. 73-25, 324)

31. Thelen, H. Matching teachers and pupils. National Education Association Journal, 1967, 56(4), 18-20.

32. Tuckman, B. W., McCall, K. M., & Hyman, R. T. The modification of teacher behavior: Effects of dissonance and coded feedback. American Educational Research Journal, 1969, 6, 607-619.

33. Tuckman, B. W., & Oliver, W. The effectiveness of feedback to teachers as a function of source. The Journal of Educational Psychology, 1968, 59, 297-301.

34. Witkin, H. A. Cognitive Style in academic performance and in teacher-student relations. In S. Messick (Ed.), Individuality and learning: Implications of cognitive style and creativity for human development. San Francisco: Jossey-Bass, 1976.

35. Witkin, H. A., Moore, C. A., Goodenough, D. R., & Cox, P. W. Field-dependent and field-independent cognitive style and their educational implications. Review of Educational Research, 1977, 47, 1-64.

36. Witkin, H. A., Oltman, P. K., Raskin, E., & Karp, S. A. A manual for the embedded figures test. Palo Alto, Calif.: Consulting Psychologists Press, 1971.

37. Yamamoto, K. Relationships between creative thinking abilities of teachers and achievement and adjustment of pupils. Journal of Experimental Education, 1963, 32, 3-25.